

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A heat exchanger ~~of~~including plate ~~fin~~fins and tube ~~type~~ comprising:

a plurality of fins stacked at ~~given~~respective intervals ~~to one another~~, and
a plurality of heat exchanger tubes penetrating said fins in ~~the~~a fin-stacking direction, said heat exchanger ~~being designed to perform a mutual~~exchanging heat ~~exchange~~ between a first fluid inside said heat exchanger tubes and ~~another~~a second fluid outside said heat exchanger tubes, through said heat exchanger tubes and said fins, wherein

each of said fins ~~is provided with~~includes a plurality of cut-raised portions, at least one ~~or more~~ cut-raised ~~portion~~portion corresponding to each of said heat exchanger tubes and being disposed substantially only within a region of said fin satisfying ~~the following relationship~~,

$$W_s = (1 - \varphi) D_p + \varphi D$$

$$\varphi > 0.5,$$

~~wherein~~ W_s is ~~an~~ entire spread width of said ~~at least~~ one ~~or more~~ cut-raised ~~portion~~portion corresponding to each of said heat exchanger tubes in a column direction ~~defined as a direction that extends~~ along an end of said fin on ~~the~~an upstream side of ~~said~~the second fluid ~~outside~~outside ~~said~~the heat exchanger tubes,

D is an outer diameter of each of said heat exchanger tubes, and

D_p is ~~an~~ alignment pitch of said heat exchanger tubes in ~~said~~the column direction.

2. (Currently Amended) The heat exchanger according to claim 1, wherein said at least one ~~or more~~ cut-raised ~~portion~~portion corresponding to each of said heat exchanger tubes ~~are~~is disposed only in a region of said fin which falls within 130 ~~degree~~degrees in ~~the~~a central angle of ~~said~~the corresponding heat exchanger tube, toward ~~the~~an upstream or downstream direction of ~~said~~the second fluid ~~outside~~outside ~~said~~the heat exchanger tubes.

3. (Currently Amended) The heat exchanger according to claim 1-~~or 2~~, wherein said cut-raised portion has two opposite edges disconnected from ~~the~~a main body of said fin, at least one of said edges extending obliquely relative to ~~said~~the column direction.

4. (Currently Amended) The heat exchanger according to ~~any one of claims~~ claim 1-~~to 3~~, wherein said cut-raised portion has two opposite edges disconnected from ~~the~~a main body of said fin, at least one of said edges extending in ~~the~~a radial direction of ~~said~~the corresponding heat exchanger tube.

5. (Currently Amended) The heat exchanger according to ~~any one of claims~~ claim 1-~~to 4~~, wherein said cut-raised portion has two opposed side ends ~~not disconnected from the~~connected to a main body of said fin, at least one of said side ends extending in a direction perpendicular to ~~said~~the column direction.

6. (Currently Amended) The heat exchanger according to claim 1, ~~wherein including at least~~ two ~~or more~~ cut-raised portions ~~are provided~~ for each of said heat exchanger tubes, said cut-raised portions being disposed symmetrically with respect to an axis passing through the center of said corresponding heat exchanger tube and extending in a direction perpendicular or parallel to ~~said~~the column direction.

7. (Currently Amended) The heat exchanger according to ~~any one of claims~~ claim 1-~~to 5~~, wherein said cut-raised portion has a shape raised alternately in ~~the~~a longitudinal direction of said heat exchanger tubes, ~~based on the basis of~~ ~~the~~a main body of said fin.

8. (Currently Amended) The heat exchanger according to ~~any one of claims~~ claim 1-~~to 6~~, wherein said fin ~~is provided with~~ ~~includes~~ a convex-shaped protrusion continuously extending in ~~said~~the column direction.

9. (Currently Amended) The heat exchanger according to ~~any one of claims~~
~~claim 1 to 8~~, wherein said cut-raised ~~portion~~ portion is cut and raised from ~~the~~ main
body of said fin to form a bridge shape which has a leg segment connected to said main
body, and a beam segment spaced apart from said main body.